Name: Date:

Polynomial Factoring solution (version 13)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 4x + 22 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(22)}}{2(1)}$$

$$x = \frac{-(-4) \pm \sqrt{16 - 88}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{-72}}{2}$$

$$x = \frac{4 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{4 \pm 6\sqrt{2}\, i}{2}$$

$$x = 2 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $5 - 2i$ and $4 - 9i$ in standard form $(a + bi)$.**

Solution

$$(5 - 2i) \cdot (4 - 9i)$$

$$20 - 45i - 8i + 18i^2$$

$$20 - 45i - 8i - 18$$

$$20 - 18 - 45i - 8i$$

$$2 - 53i$$

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3. **Write function $f(x) = x^3 + x^2 - 22x - 40$ in factored form. I'll give you a hint: one factor is $(x + 2)$.**

Solution

	1	1	-22	-40
-2		-2	2	40
	1	-1	-20	0

$$f(x) = (x + 2)(x^2 - x - 20)$$

$$f(x) = (x + 2)(x + 4)(x - 5)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x + 3) \cdot (x - 2) \cdot (x - 6)^2$$

Sketch a graph of polynomial $y = p(x)$.